(21)

Supreme Court, U.S.
FILED
JAN 19 1993
OFFICE OF THE CLERK

No. 92-102

In the Supreme Court of the United States

OCTOBER TERM, 1992

WILLIAM DAUBERT AND JOYCE DAUBERT, Individually and as Guardians Ad Litem for Jason Daubert, and ANITA DE YOUNG, Individually and as Guardian Ad Litem for Eric Schuller,

Petitioners,

v.

MERRELL DOW PHARMACEUTICALS, INC.,

Respondent.

On Writ of Certiorari to the United States Court of Appeals for the Ninth Circuit

BRIEF OF THE PHARMACEUTICAL MANUFACTURERS ASSOCIATION AS AMICUS CURIAE IN SUPPORT OF RESPONDENT

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January 19, 1993

40 pp

TABLE OF CONTENTS

Page

TABLE OF AUTHORITIES iii

INTEREST OF AMICUS CURIAE 1

STATEMENT OF THE CASE 2

A. Federal Law Requires That the Safety of Medicines Be Determined and Monitored in Accordance With Principles and Methodologies Generally Accepted by the Relevant Scientific Community 3

B. The Safety of Bendectin Has Been Established in Accordance with Principles and Methodologies Generally Accepted by the Relevant Scientific Community 7

SUMMARY OF ARGUMENT 9

ARGUMENT 12

I. THE PUBLIC INTEREST IN THE AVAILABILITY OF SAFE AND EFFECTIVE MEDICINES WOULD BE SERIOUSLY DISSERVED IF THIS COURT WERE TO OPEN THE DOOR TO SCIENTIFIC OPINION TESTIMONY NOT GROUNDED IN PRINCIPLES AND METHODOLOGIES GENERALLY ACCEPTED BY THE RELEVANT SCIENTIFIC COMMUNITY 12

II. THE FEDERAL RULES OF EVIDENCE REQUIRE THE DISTRICT COURTS TO EXCLUDE SCIENTIFIC OPINION TESTIMONY NOT GROUNDED IN PRINCIPLES AND METHODOLOGIES GENERALLY ACCEPTED BY THE RELEVANT SCIENTIFIC COMMUNITY. 19

CONCLUSION 28

TABLE OF AUTHORITIES

Page

CASES

In re "Agent Orange" Product Liability Litigation, 611 F.2d 1223 (E.D.N.Y. 1985), *aff'd*, 818 F.2d 187 (2d Cir. 1987) 21, 25

In re Air Crash Disaster at New Orleans, La., 795 F.2d 1230 (5th Cir. 1986) 21

Brock v. Merrell Dow Pharmaceuticals, Inc., 874 F.2d 307, *modified*, 884 F.2d 166, *reh'g denied, en banc*, 884 F.2d 167 (5th Cir. 1989), *cert. denied*, 494 U.S. 1046 (1990) 23, 27

Christophersen v. Allied-Signal Corp., 939 F.2d 1106 (5th Cir. 1991), *cert. denied*, 112 S. Ct. 1280 (1992) 23

DeLuca v. Merrell Dow Pharmaceuticals, 791 F. Supp. 1042 (D.N.J. 1992), *on remand from DeLuca v. Merrell Dow Pharmaceuticals*, 911 F.2d 941 (3d Cir. 1990) 13, 27

Frye v. United States, 293 F. 1013 (D.C. Cir. 1923) 19

Head v. Lithonia Corp., 881 F.2d 941 (10th Cir. 1989) . . . 23

Huddleston v. United States, 485 U.S. 681 (1988) 20

Lynch v. Merrell-National Laboratories, 830 F.2d 1190 (1st Cir. 1987) 23, 26, 27

Owen v. City of Independence, 445 U.S. 622 (1980) 12

Pease v. American Cyanamid, 795 F. Supp. 755 (D. Md. 1992) 18

Porter v. Whitehall Laboratories, Inc., 791 F. Supp. 1335 (S.D. Ind. 1992) 21

Richardson v. Richardson-Merrell, Inc., 857 F.2d 823 (D.C. Cir. 1988), *cert. denied*, 493 U.S. 882 (1989) 21, 23

Sterling v. Velsicol, 855 F.2d 1188 (6th Cir. 1988) 22

Toys "R" Us, Inc. v. Canarsie Kiddie Shop, Inc., 559 F. Supp. 1189 (E.D.N.Y. 1983) 25

Turpin v. Merrell Dow Pharmaceuticals, 959 F.2d 1349 (6th Cir.), *cert. denied*, 113 S. Ct. 84 (1992) 21

United States v. Abel, 469 U.S. 45 (1984) 19

United States v. Addison, 498 F.2d 741 (D.C. Cir. 1974) 21, 22

United States v. Downing, 753 F.2d 1224 (3d Cir. 1985) . . 19

United States v. Metzger, 778 F.2d 1195 (6th Cir. 1985), *cert. denied*, 477 U.S. 906 (1986) 20

United States v. Tranowski, 659 F.2d 750 (7th Cir. 1981) 23

Viterbo v. Dow Chemical Co., 826 F.2d 420 (5th Cir. 1987) 21, 22

Weinberger v. Bentex Pharmaceuticals, Inc., 412 U.S. 645 (1973) 6

Zippo Manufacturing Co. v. Rogers Imports, Inc., 216 F. Supp. 670 (S.D.N.Y. 1963) 25

STATUTES, RULES, LEGISLATIVE & REGULATORY MATERIALS

21 U.S.C. §§ 301 *et seq.* 3

21 U.S.C. § 321 (1988) 6

21 U.S.C.A. § 343 (1990) 6

21 U.S.C. § 355 (1988) 3, 4

National Vaccine Compensation Act, 42 U.S.C. §§ 300aa-1 *et seq.* 18

42 U.S.C. § 300aa-16 (1988) 18

FED. R. EVID. 102 . . . . . 11, 19, 20

FED. R. EVID. 403 25

FED. R. EVID. 702 . . . . . *passim*

FED. R. EVID. 703 . . . . . *passim*

H.R. No. 4210, 102d Cong., 2d Sess. (1992) 18

House Committee on Agriculture, Hearings on USDA-FDA Announcement on Nitrites and Related Issues, 96th Cong., 2d Sess. (1980) 6

21 C.F.R. § 14.5 (1992) 5

21 C.F.R. § 14.160 (1992) 5

21 C.F.R. § 14.171 (1992) 6

21 C.F.R. § 170.30 (1992) 6

21 C.F.R. § 314.50 (1992) 4

21 C.F.R. § 314.80 (1992) 4

21 C.F.R. § 314.126 (1992) 4

45 Fed. Reg. 49682 (1980) 8

45 Fed. Reg. 51921 (1980) 8

45 Fed. Reg. 58966 (1980) 8

45 Fed. Reg. 80740 (1980) 8

Department of Health and Human Services, *Guidelines Applicable to the Center for Drug Evaluation and Research's Regulations* (undated) 4

Department of Health, Education and Welfare, *Final Report: Review Panel on New Drug Regulation* (1977) 5

Food and Drug Administration, *FDA Public Advisory Groups: Authority, Structure, Functions, Members* (1990) 5

Food and Drug Administration, Fertility and Maternal Health Drugs Advisory Committee, *Proceedings of Meeting on Bendectin* (Sept. 15-16, 1980) 7, 8

Food and Drug Administration, National Center for Drugs and Biologics, *Report in Response to Questions Contained in Congressman Walgren's May 6, 1982 Letter on Bendectin* (Feb. 23, 1983) 8

Food and Drug Administration, *Talk Paper: Bendectin* (Oct. 1, 1979) 7

Food and Drug Administration, *Talk Paper: Bendectin* (June 29, 1982) 8

INTERNATIONAL MATERIALS

Australian Drug Evaluation Committee, *Debendox in Pregnancy*, 53 MED. J. AUSTRALIA 197 (1980) 9

Bundesgesundheitsamt (Germany), *Statement Concerning the Antiemeticum Lenotan* (June 1980) 9

Interkantonale Kontrollstelle Für Heilmittel (Switzerland), *Lenotan/Antinausea Drug During Early State Pregnancy* (Feb. 8, 1980) 9

National Drugs Advisory Board (Ireland), *Final Statement* (May 13, 1980) 9

Special Advisory Committee on Reproductive Physiology (Canada), *Report on the Safety of Bendectin/Diclectin for Use in the Management of Nausea and Vomiting in Pregnancy* (Aug. 11, 1989) 9, 10, 15

Statement of Sir George Young, Under-Secretary of State for Health and Social Security in Address to Parliament (Great Britain), 984 PARL. DEB., H.C. (5th Ser.) 672-73 (1980) 9

World Health Organization, *Drug Information Bulletin* (Oct.-Dec. 1979) 9

BOOKS, ARTICLES & OTHER MATERIALS

FROM TEST TUBE TO PATIENT: NEW DRUG DEVELOPMENT IN THE UNITED STATES (Food and Drug Administration, 1990 rev. ed.) 5

THE LIABILITY MAZE: THE IMPACT OF LIABILITY LAW ON SAFETY AND INNOVATION (Peter W. Huber & Robert E. Litan, eds., 1991) 15, 17

Mario Bunge, SCIENTIFIC RESEARCH (1967) 14

William G. Cochran & Gertrude M. Cox, EXPERIMENTAL DESIGNS (1950) 14

Michael H. Graham, HANDBOOK OF FEDERAL EVIDENCE (3d ed. 1991) 20, 21, 24

Warren O. Hagstrom, THE SCIENTIFIC COMMUNITY (1965) . 14

Peter W. Huber, GALILEO'S REVENGE: JUNK SCIENCE IN THE COURTROOM (1991) 15

Institute of Medicine, ADVERSE EFFECTS OF PERTUSSIS AND RUBELLA VACCINES (1991) 16, 17

John Stuart Mill, 2 SYSTEM OF LOGIC (5th ed. 1872) 24

E. Bright Wilson, Jr., AN INTRODUCTION TO SCIENTIFIC RESEARCH (3d ed. 1990) 14

Ad Hoc Committee for the Child Neurology Society Consensus Statement on Pertussis Immunization and the Central Nervous System, *Consensus Statement: Pertussis Immunization and the Central Nervous System*, 29 ANNALS OF NEUROLOGY 458 (1991) 17

American College of Obstetricians and Gynecologists, *ACOG Statement on Bendectin* (June 10, 1983) . . . 2, 15

American Medical Association, *Impact of Product Liability on the Development of New Medical Technologies* (June 1988) 18

C.I. Barash & Louis Lasagna, *The Bendectin Saga: "Voluntary" Discontinuation*, 1 J. CLIN. RES. DRUG. DEV. 277 (1982) 7

Robert L. Brent, *Editorial: The Bendectin Saga: Another American Tragedy*, 27 TERATOLOGY 283 (1983) 16

Guido Calabresi, *Optimal Deterrence and Accidents*, 84 YALE L.J. 656 (1975) 12

Edward W. Cleary, Reporter for the Federal Rules of Evidence, *Preliminary Notes on Reading the Rules of Evidence*, 57 NEB. L. REV. 908 (1978) 20

C. L. Cody, *et al., Nature and Rates of Adverse Reactions Associated with DTP and DT Immunizations in Infants and Children*, 68 PEDIATRICS 656 (1984) 17

Committee on Infectious Diseases, American Academy of Pediatrics, *The Relationship Between Pertussis Vaccine and Brain Damage: Reassessment*, 88 PEDIATRICS 397 (1991) 17

Alan R. Hinmon & Jeffrey P. Koplan, *Pertussis and Pertussis Vaccine: Reanalysis of Benefits, Risks and Costs*, 251 J. AM. MED. ASSOC. 3104 (1984) 17

Immunization Practice Advisory Committee, Centers for Disease Control, *Diptheria, Tetanus, and Pertussis: Recommendations for Vaccine Use and Other Preventive Measures*, 40 MMWR 1 (1991) 16, 17

David A. Kessler, *Food Safety: Revising the Statute*, 223 SCIENCE 1034 (1984) 6

Steven H. Lamm, *et al.*, *Public Health Consequences of Not Prescribing Antiemetics for Nausea and Vomiting During Pregnancy* (abstract), Epidemic Intelligence Service, 38th Annual Conference (Centers for Disease Control, April 3-7, 1989) 2

J. Steven Leeder, *et al.*, *Editorial: The Wrong Way to Regulate Drug Availability*, 129 CAN. MED. ASSOC. J. 1085 (1983) 15

Robert M. McKenna, *The Impact of Product Liability Law on the Development of a Vaccine Against the AIDS Virus*, 55 U. CHI. L. REV. 943 (1988) 17

President's Council on Competitiveness, *Agenda for Civil Justice Reform in America* (1991) 18

Joseph Sanders, *The Bendectin Litigation: A Case Study in the Life Cycle of Mass Torts*, 43 HAST. L. REV. 301 (1992) 15

Andrew Skolnick, *Key Witness Against Morning Sickness Drug Faces Scientific Fraud Charges*, 263 J. AM. MED. ASSOC. 1468 (1990) . . . . . *passim*

Shanna Swan, *Methodological Issues in the Study of Prenatal Drug Exposures and Congenital Malformations: Bendectin Reanalyzed* (abstract), 170 AM. J. OF EPIDEMIOL. 486 (1984) 26

Therapeutics and Technology Assessment Subcommittee, American Academy of Neurology, *Assessment: DTP Vaccination*, 42 NEUROLOGY 471 (1992) 17

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BRIEF OF THE PHARMACEUTICAL MANUFACTURERS ASSOCIATION AS AMICUS CURIAE IN SUPPORT OF RESPONDENT

This brief is submitted in support of respondent, Merrell Dow Pharmaceuticals, Inc. ("Merrell"). By letters filed with the Clerk of the Court, petitioners and respondent have consented to the filing of this brief.

INTEREST OF AMICUS CURIAE

The Pharmaceutical Manufacturers Association ("PMA") is a voluntary, nonprofit association representing over 100 companies engaged in the discovery, development and marketing of prescription pharmaceutical products. PMA member companies produce the vast majority of prescription medicines used in the United States. They annually invest more than $8 billion in research and development, and this substantial private research effort is

the source of virtually all new medicines marketed in the United States. PMA member companies, together with the physicians who prescribe and the patients who use their products, have an important interest in making sure that the safety of these products is judged by techniques that are scientifically sound.

STATEMENT OF THE CASE

Bendectin—the product at issue in this case—is the only anti-nausea drug for pregnant women ever approved by the Food and Drug Administration ("FDA"). It was first sold in the United States in 1956, and during the next 27 years it was used in more than 33 million pregnancies. The FDA repeatedly reaffirmed its safety based on, among other things, scientific studies of this extensive actual usage. But respondent Merrell decided in 1983 to remove Bendectin from the market in the face of tort claims based on scientific opinion testimony of the kind rejected in this case.

The withdrawal of Bendectin from the market created what the American College of Obstetricians and Gynecologists called a "significant therapeutic gap."[1] Severe nausea during pregnancy is a serious condition for which Bendectin was the only effective therapy; since the withdrawal of Bendectin, the rate of hospitalization for this condition has doubled,[2] and the threat of pregnancy-related dehydration, acidosis, maternal nutritional deficiencies and

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[1] American College of Obstetricians and Gynecologists, *ACOG Statement on Bendectin* 1 (June 10, 1983).

[2] Steven H. Lamm, *et al.*, *Public Health Consequences of Not Prescribing Antiemetics for Nausea and Vomiting During Pregnancy* (abstract), Epidemic Intelligence Service, 38th Annual Conference (Centers for Disease Control, April 3-7, 1989). This has resulted in approximately $40 million in additional annual hospitalization costs. *Id.*

nerve damage—conditions that imperil the health of both mother and fetus—has increased.[3]

We argue in this brief that opening the door to scientific opinion testimony not grounded in principles and methodologies generally accepted in the relevant scientific community would be bad for the public's health as well as contrary to the Federal Rules of Evidence. We begin by describing the process by which the FDA, relying on the scientific community, determines the safety of medicines in general and determined that Bendectin in particular is safe and should be available to the women who need it.

A. Federal Law Requires That the Safety of Medicines Be Determined and Monitored in Accordance With Principles and Methodologies Generally Accepted by the Relevant Scientific Community

The Federal Food, Drug, and Cosmetic Act ("FD&C Act"), 21 U.S.C. §§ 301 *et seq.*, requires the FDA to determine the safety of a new medicine before allowing it to be sold, *id.* at § 355(d), and to monitor its safety continuously thereafter. *Id.* at § 355(e). This process is designed to rely on accepted scientific principles and methodologies and to bring to bear the views of the body of experts who comprise the relevant scientific community.

The FD&C Act requires the sponsor of a proposed new medicine to provide "adequate tests by all methods reasonably applicable" to show that the medicine is safe. 21 U.S.C. § 355. FDA regulations implementing this provision require an application containing a summary

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[3] Andrew Skolnick, *Key Witness Against Morning Sickness Drug Faces Scientific Fraud Charges*, 263 J. AM. MED. ASSOC. 1468, 1473 (1990).

"written at approximately the level of detail required for publication in . . . refereed scientific and medical journals." 21 C.F.R. § 314.50(c)(1) (1992). The application itself must contain elaborately prescribed chemical, biological, pharmacological, clinical, statistical, and case-report information, which must be set forth "in sufficient detail to permit the agency to make a knowledgeable judgment." *Id.* at § 314.50(d). The regulations explicitly require information that will enable scientific reviewers to evaluate the data supplied, such as a "description of the analytical and statistical methods used in each [bioavailability or pharmacokinetic] study," *id.* at § 314.50(d)(3)(i), and "the protocol and a description of the statistical analyses used to evaluate" each chemical study, *id.* at § 314.50(d)(5)(ii). In accordance with good scientific practice, information must also be provided about any unanalyzed or discontinued studies. *Id.* The flow of information continues after marketing of a drug begins. *See id.* at §§ 314.80-81.[4]

Even more importantly, the essence of the FDA's examination of data submitted and other information bearing on drug safety is critical evaluation by scientific experts applying accepted principles and methodologies. The FDA itself, of course, employs scientists trained in the

[4] In addition to requiring "adequate tests" of safety, the FD&C Act requires "adequate and well controlled investigations" of effectiveness. 21 U.S.C. § 355(d). A good indication of the kind of scientific information the FDA requires is its extremely elaborate definition of this term, including specific requirements concerning controls, methods of selection of subjects, methods of assigning patients to treatment and control groups, measures to minimize bias on the part of subjects, obeervers and analysts, and an instruction to follow "well defined and reliable" methods of assessment of subjects' responses. *Id.* at § 314.126(b) (1992). *See also* Department of Health and Human Services, *Guidelines Applicable to the Center for Drug Evaluation and Research's Regulations* (undated).

various relevant scientific disciplines[5] who work together to evaluate new drug applications[6] and monitor drug performance after marketing begins.[7] But in order to assure that the principles and methodologies applied by its own scientists are accepted by the relevant scientific community, the FDA backs them up with seventeen standing advisory committees of scientific professionals who are experts on matters relating to drugs and biologics. "[A]dvisory committees offer FDA staff a dialogue with the nation's foremost experts in drug therapy. The committees are thus an important source of peer review for proposed FDA decisions."[8] Although the FDA is not legally bound to follow the recommendations of its advisory committees, *see* 21 C.F.R. § 14.5 (1992), it usually does, and the use of advisory committees has been

[5] There are several groups of such scientists, including chemists (to examine a medicine's chemical properties); pharmacologists (to evaluate effects on laboratory animals); physicians (to evaluate clinical tests); statisticians (to evaluate the design, validity, and conclusions of controlled studies and statistical analyses); and other experts who evaluate how a drug's active ingredients are distributed, metabolized and eliminated. *See* Dixie Farley, *How FDA Approves New Drugs*, *in* FROM TEST TUBE TO PATIENT: NEW DRUG DEVELOPMENT IN THE UNITED STATES 29 (Food and Drug Administration, 1990 rev. ed.).

[6] *See id.*; Department of Health, Education and Welfare, *Final Report: Review Panel on New Drug Regulation* 21 (1977) [hereinafter "*HEW Final Report*"].

[7] Stephen J. Ackerman, *Watching for Problems That Testing May Have Missed*, *in* FROM TEST TUBE TO PATIENT: NEW DRUG DEVELOPMENT IN THE UNITED STATES 49 (Food and Drug Administration, 1990 rev. ed.); *HEW Final Report* at 92-93.

[8] *HEW Final Report* at 52. *See also* 21 C.F.R. § 14.160(b)(2) (1992) (in the case of human prescription drugs, FDA relies on advisory committees to advise it as to whether a "particular drug meets the statutory standard for proof of safety and effectiveness necessary for approval or continued approval for marketing"); Food and Drug Administration, *FDA Public Advisory Groups: Authority, Structure, Functions, Members* iii (1990).

much encouraged.[9] FDA advisory committees play a particularly significant role in cases where the FDA has been presented with evidence suggesting that a drug being marketed is not safe. *See* 21 C.F.R. § 14.171(b)(2) (1992).[10]

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[9] The present FDA Commissioner, Dr. David Kessler, had once criticized the agency for acting on isolated evidence not evaluated by the relevant scientific community. *See* David A. Kessler, *Food Safety: Revising the Statute*, 223 SCIENCE 1034, 1039 (1984). The case involved a plan to ban the use of nitrites as a food additive on the basis of a single study finding that nitrites caused an increased incidence of lymphatic cancer in certain laboratory animals. Subsequent peer review of the study showed that its author had misinterpreted the data and that there was no basis for the conclusion that nitrites cause cancer. *See* U.S. Congress, House Committee on Agriculture, Hearings on USDA-FDA Announcement on Nitrites and Related Issues, 96th Cong., 2d Sess. (1980). According to Kessler, "[t]his incident clearly demonstrated the need for independent scientific review of important food safety studies." Kessler at 1039.

[10] The FD&C Act itself provides that whether a drug is "new," and thus needs premarketing approval, depends on the view of the relevant scientific community. A drug is not "new" if it is "generally recognized, among experts qualified by scientific training and expertise to evaluate the safety and effectiveness of drugs, as safe and effective for use." 21 U.S.C. § 321(p)(1) (1988). As this Court explained in *Weinberger v. Bentex Pharmaceuticals, Inc.*, 412 U.S. 645, 652 (1973), "[w]hether a particular drug is a 'new drug,' depends in part on the expert knowledge and experience of scientists based on controlled clinical experimentation and backed by substantial support in scientific literature."

The FDA places similar reliance on the views of relevant scientific communities in other areas of its work. FDA determinations of whether a food additive is "generally recognized as safe," and therefore does not need pre-marketing approval, rely on "common knowledge about the substance throughout the scientific community knowledgeable about the safety of substances directly or indirectly added to food," 21 C.F.R. § 170.30(a) (1992); the determination is ordinarily based on published studies, *id.* at § 170.30(b). And FDA evaluations of the truth of health claims for foods require a

B. The Safety of Bendectin Has Been Established in Accordance with Principles and Methodologies Generally Accepted by the Relevant Scientific Community

The role of the scientific community in evaluating the safety of a medicine is well illustrated by the FDA's extensive review of the safety of Bendectin. Bendectin was first approved as safe by the FDA and marketed in 1956.[11] The FDA continued to monitor the drug's safety throughout the 1960's and 70's. In 1979, the FDA summarized its review of Bendectin up to that point, finding "no evidence" associating the drug with birth defects.[12] The next year, the FDA asked its Fertility and

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determination "that there is significant scientific agreement among experts qualified by scientific training and experience to evaluate such claims." 21 U.S.C.A. § 343(r)(3)(B)(i) (1990). Such scientific agreement must include "evidence from well-designed studies conducted in a manner which is consistent with generally recognized scientific procedures and principles." *Id.*

[11] C.I. Barash & Louis Lasagna, *The Bendectin Saga: "Voluntary" Discontinuation*, 1 J. CLIN. RES. DRUG. DEV. 277, 282 (1982); Food and Drug Administration, Fertility and Maternal Health Drugs Advisory Committee, 2 *Proceedings of Meeting on Bendectin* 8 (Sept. 15-16, 1980) [hereinafter *"Bendectin Proceedings"*].

[12] Food and Drug Administration, *Talk Paper: Bendectin* 1-2 (Oct. 1, 1979):

> Because of the extensive use of this drug, FDA over the years has carefully monitored it, with a particular view to its effect on the fetus. In the studies to date, there is no evidence that Bendectin is associated with an increased risk of birth defects. Tests have been conducted in rats and rabbits in which doses up to 100 times the maximum human dose were given; no association was reported. Also reviewed by FDA have been several large epidemiological studies in women who received the drug

Maternal Health Drugs Advisory Committee to review the scientific data on the issue.[13] The Committee heard more than thirty witnesses, including experts in the fields of pharmacology, epidemiology, obstetrics, gynecology and pediatrics, and reviewed eight major human epidemiological studies, five major case control studies (*i.e.*, studies in which subjects are selected in accordance with their disease status and investigated to determine their prior histories of exposure), and over twenty years of animal studies. Food and Drug Administration, *Bendectin Proceedings*. On the basis of all the existing data, the Committee concluded that no "association between the drug and an increased risk of human birth defects" had been demonstrated.[14] The FDA revisited the question of Bendectin's safety in 1982-83. A 34-page report prepared by its Center for Drugs and Biologics reviewed the history of Bendectin, examined human and animal studies of Bendectin and its individual components, and concluded that the "available information [does not] support[] a conclusion that Bendectin is teratogenic in humans."[15]

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during pregnancy.

The circumstances leading to this statement are described in Skolnick, *supra* note 3, at 1469.

[13] *See* Meeting Notices, 45 Fed. Reg. 49682 (1980); 45 Fed. Reg. 51921 (1980); 45 Fed. Reg. 58966 (1980).

[14] 45 Fed. Reg. 80740, 80741 (1980). The Committee did note a "residual uncertainty" in the sensitivity of several of the available studies and recommended that certain current epidemiological studies of Bendectin be continued and that certain changes be made in the drug's labeling. *Id.* The FDA later explained that the "'residual uncertainty' existed in spite of the largely negative human experience since it is not possible to prove unequivocally that a drug could never cause birth defects." Food and Drug Administration, *Talk Paper: Bendectin* 1 (June 29, 1982).

[15] Food and Drug Administration, National Center for Drugs and Biologics, *Report in Response to Questions Contained in Congressman*

SUMMARY OF ARGUMENT

Opening the door to scientific opinion testimony not grounded in principles or methodologies generally accepted by the scientific community would be bad for the public's health as well as contrary to the Federal Rules of Evidence.

1. There is an important public health interest in the availability of medicines that have been shown to be

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Walgren's May 6, 1982 Letter on Bendectin 34 (Feb. 23, 1983). The national health agencies of at least six other countries (Canada, Australia, Germany, Great Britain, Ireland and Switzerland), as well as the World Health Organization, have reached the same conclusion—namely, that the evidence does not support the view that Bendectin is a teratogen. *See* Special Advisory Committee on Reproductive Physiology (Canada), *Report on the Safety of Bendectin/Diclectin for Use in the Management of Nausea and Vomiting in Pregnancy* (Aug. 11, 1989), Joint Appendix ("JA") 212 [hereinafter *"Canadian Report"*]; Australian Drug Evaluation Committee, *Debendox in Pregnancy*, 53 MED. J. AUSTRALIA 197 (1980). ("Sub-committee does not consider that the use of Debendox [Bendectin] in pregnancy has been shown to increase the risk of birth defects."); Bundesgesundheitsamt (Germany), *Statement Concerning the Antiemeticum Lenotan* (June 1980); National Drugs Advisory Board (Ireland), *Final Statement* (May 13, 1980); Statement of Sir George Young, Under-Secretary of State for Health and Social Security, in address to Parliament (Great Britain), 984 PARL. DEB., H.C. (5th Ser.) 672-73 (1980) ("[W]e probably know more about this drug than any other which might be used for vomiting in pregnancy, and what we know is reassuring—that is, that all the research that has been carried out suggests that a woman who takes Debendox [Bendectin] is no more likely to put her unborn child at risk than a mother who does not."); Interkantonale Kontrollstelle Für Heilmittel ("IKS") (Switzerland), *Lenotan/Antinausea Drug During Early Stage Pregnancy* (Feb. 8, 1980); World Health Organization, *Drug Information Bulletin* (Oct.-Dec. 1979) ("[M]ore than 20 million women are known to have used [Bendectin and related drugs] since 1956. Neither experimental studies nor epidemiological investigations have yielded evidence to justify concern [about an alleged association with congenital malformations].").

safe and effective. For example, Bendectin filled a significant therapeutic gap: it was the only available drug therapy for serious nausea and vomiting experienced by many women during pregnancy; such a therapy is needed to combat a sometimes serious threat to the nourishment of both mother and fetus.

The availability of safe and effective drugs depends not only on the successful functioning of the regulatory scheme administered by the FDA but also on the proper operation of the tort system. Whether a given drug has a particular effect is generally a scientific question, and while "science" is not a fixed body of knowledge, there are principles and methodologies that are generally accepted by scientific communities; there are also sincerely held individual opinions, based on idiosyncratic views or poorly conducted studies, to which other scientists themselves accord no weight. The FDA regulatory scheme is designed to bring sound science to bear on questions of drug safety. If the tort system were opened up to allow lay juries to hear and rely on scientific opinions not grounded in generally accepted principles and methodologies—opinions that the relevant scientific community itself would not rely on—the result would be to discourage both the marketing of, and research toward, safe and effective medicines important for the public's health.

The case of Bendectin is a good example. Federal courts applying the Rules of Evidence have in almost every case ultimately rejected claims that Bendectin is a teratogen. But even the threat of claims based on evidence like that proffered in this case was sufficient: Bendectin is not available today because "the manufacturer . . . found the legal costs of defending its use (successfully in the majority of cases) to be prohibitive." *Canadian Report*, JA at 215.

2. The Federal Rules of Evidence require the exclusion of scientific opinions not grounded in generally

accepted principles and methodologies. While there are many sources of support for this conclusion, our argument is based squarely on the text of the pertinent Rules.

Rule 102 provides that the Rules are to be "construed to secure . . . promotion of growth and development of the law of evidence to the end that the truth may be obtained." It thus explicitly instructs the courts to construe the terms of the other Rules to provide a foundation for a body of evidence law that will assist the search for truth.

Rule 702 permits expert testimony as to scientific "knowledge" that will "assist the trier of fact." The witness may testify only "thereto." The plain meaning of scientific "knowledge" is matters the relevant scientific community "knows." Opinions not grounded in such knowledge do not "assist the trier of fact" to reach the truth.

Rule 703 allows the expert to base his opinion on unproven "facts or data . . . . of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject . . . ." The plain meaning of this Rule is that where (as in virtually every case of this kind) the testimony is based on scientific work not in evidence, the court must determine whether the relevant community of scientists would rely on that work. Petitioners' argument that this Rule relates only to bits of information and not, for example, to the method of determining which bits are relevant, is contrary to the text and thrust of the Rule as well as the search for truth.

The opinion testimony at issue in this case, which was based on the witnesses' reanalyses of epidemiological data, was properly rejected. An expert seeking support for a desired conclusion can all too easily find that support through plausible retrospective adjustments to the numerators and denominators of past statistical studies. When he does so but neither submits his adjustments to review by other scientists, nor otherwise demonstrates that

his work would be relied on by other scientists, his opinion does not assist the search for truth.

ARGUMENT

I. THE PUBLIC INTEREST IN THE AVAILABILITY OF SAFE AND EFFECTIVE MEDICINES WOULD BE SERIOUSLY DISSERVED IF THIS COURT WERE TO OPEN THE DOOR TO SCIENTIFIC OPINION TESTIMONY NOT GROUNDED IN PRINCIPLES AND METHODOLOGIES GENERALLY ACCEPTED BY THE RELEVANT SCIENTIFIC COMMUNITY.

One aim of tort law is to deter harmful conduct.[16] By imposing liability on the manufacturer of an unsafe product, society discourages its manufacture and sale.[17] But the deterrent effect is not automatically limited to products that actually cause injury. If there is a threat that unsound scientific opinion evidence will lead juries to award damages in cases where the asserted causal link is false, that threat will just as surely discourage the production of safe and beneficial products. If the door to such evidence were opened in cases involving prescription drugs, the result would be to deny the public safe, life-saving and health-preserving medicines.

Whether a given medicine has a particular effect is generally a scientific question and often a complex one. That is, the question can be answered truthfully only after the application of one or several scientific tests and analyses. As we have outlined above, when the FDA examines such questions, it seeks to bring to bear

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[16] *E.g.*, *Owen v. City of Independence*, 445 U.S. 622, 651 (1980).

[17] *See* Guido Calabresi, *Optimal Deterrence and Accidents*, 84 Yale L.J. 656 (1975).

principles and methodologies generally accepted by the relevant scientific community.

But the FDA is not the only body whose views determine whether a drug will be marketed. If a lay jury finds that a drug caused a plaintiff's tragic injury, that finding may well curtail the manufacture and marketing of the drug. If the jury makes such a finding based on an erroneous scientific opinion as to causation, the result may be not only to deny the public a safe and beneficial medicine but to discourage research in related areas. Since the jury (unlike the FDA) does not have available to it a trained and neutral scientific staff and neutral advisory bodies composed of leading experts in the relevant fields, it is of immense practical importance that the Federal Rules of Evidence require that, before a proffered scientific opinion is admitted into evidence, the court determine that it is grounded in generally accepted principles and methodologies. Were this Court now to open the door, as petitioners ask, to the admission of any opinion expressed by a witness who can qualify as an expert, the adverse consequences to the public health would be very serious.

Petitioners argue (Br. 47) that because "scientific knowledge" is not a fixed body of truths, there is no basis for admitting one proffered expert opinion and excluding another.[18] But there is no reason for the Court to open the

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[18] Petitioners and certain amici also argue that restricting scientific opinion testimony to opinions grounded in generally accepted principles and methodologies restricts scientific research and may thwart recognition of an as-yet-unheralded Pasteur or Galileo. But this case has nothing to do with the right of a working scientist to speculate or disagree with his colleagues: the issue is whether the scientific evidence on which *juries* are allowed to rely should be limited to evidence on which the court finds *other scientists* would rely. And this case does not remotely involve "cutting edge" science. *See DeLuca v. Merrell Dow Pharmaceuticals, Inc.*, 791 F. Supp. 1042 (D.N.J. 1992) (lengthy analysis of the proffered testimony of two principal witnesses in *this* case, showing it to be based on a hodgepodge of unexplained,

door to permit juries to rely on scientific opinions that the relevant scientific community would not rely on. And scientific communities *do* have a way to judge any given piece of scientific work at a given time: general acceptance. "Scientific truths" are those about which "informed observers can agree."[19] "The collective judgment of scientists, in so far as there is substantial agreement, constitutes the body of science. The fact that there are very large areas of agreement, in spite of the individualistic, antiauthoritarian nature of science, is partial evidence for the validity of scientific methods."[20] And scientists *do* have generally accepted standards for evaluating the research support for specific conclusions, including the use of controls, the replicability of results, statistical analyses of possible error, and peer review through publication.[21]

The threat that safe and valuable products will be lost and important research will be discouraged is quite real. It has manifested itself even in an era in which the courts have applied the Federal Rules of Evidence to exclude scientific opinions not grounded in generally accepted principles and methodologies, making litigation like this case generally unsuccessful.

Bendectin is a perfect example. The drug is demonstrably beneficial to both mother and child in cases of severe morning sickness, and its safety has repeatedly been confirmed by the FDA. Nevertheless, because

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improperly selected, misrecorded, and mischaracterized data, assembled for purposes of litigation rather than research).

[19] Warren O. Hagstrom, THE SCIENTIFIC COMMUNITY 273 (1965).

[20] E. Bright Wilson, Jr., AN INTRODUCTION TO SCIENTIFIC RESEARCH 21 (3d ed. 1990).

[21] *See, e.g., id.* at 36-48; Mario Bunge, SCIENTIFIC RESEARCH (1967); William G. Cochran & Gertrude M. Cox, EXPERIMENTAL DESIGNS (1950).

unexplained birth defects are a constant of human experience and the use of Bendectin was very widespread, almost 1700 suits were brought against Merrell alleging that Bendectin caused such defects.[22] On the critical question of causation of injury, every plaintiff depended on scientific testimony not grounded in generally accepted principles and methodologies. But even though federal courts have broadly rejected reliance on such testimony, the costs of the litigation led Merrell in June 1983 to withdraw Bendectin from the market.[23] Thoughtful commentators blamed the loss of Bendectin squarely on the threat of litigation that, as exemplified by the decision under review, has been overwhelmingly unsuccessful.[24]

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[22] *See* Joseph Sanders, *The Bendectin Litigation: A Case Study in the Life Cycle of Mass Torts*, 43 HAST. L. REV. 301, 319 (1992).

[23] *See Canadian Report*, JA 215 (Bendectin withdrawn from market because legal costs of defending its use were "prohibitive"); *ACOG Statement on Bendectin, supra* note 1, at 1; Peter Huber, GALILEO'S REVENGE: JUNK SCIENCE IN THE COURTROOM 127 (1991); Skolnick, *supra* note 3, at 1469; Louis Lasagna, *The Chilling Effect of Product Liability on New Drug Development* 338, 340 *in* THE LIABILITY MAZE: THE IMPACT OF LIABILITY LAW ON SAFETY AND INNOVATION (Peter W. Huber & Robert E. Litan, eds., 1991).

[24] *See, e.g.*, J. Steven Leeder, *et al.*, *Editorial: The Wrong Way to Regulate Drug Availability*, 129 CAN. MED. ASSOC. J. 1085, 1087 (1983):

> The decision about which drug to use should be based on results of studies with the widest patient exposure and the best possible data that show no increased risk of birth defects. The availability of drugs should not be regulated by the media, litigation lawyers or public hysteria but should continue to be a result of careful examination of scientific evidence . . . . The net result [of the burden placed on the pharmaceutical manufacturer by litigation] is that a product well studied for use in pregnancy will no longer be available to patients requiring antiemetic medication. This will force physicians to prescribe, and pregnant women to take, medications for which we lack

The diphtheria-tetanus-pertussis ("DTP") vaccine provides a different example. Pertussis (also known as "whooping cough") was once a major cause of childhood morbidity and mortality.[25] The introduction of pertussis vaccines in the late 1940's led to a substantial decline in the disease that continued for thirty years. *Id.* In the 1950's and 1960's, however, there began to be anecdotal reports that the pertussis component of the vaccine caused sudden infant death syndrome ("SIDS") and other adverse neurological reactions. The FDA and the broader scientific community conducted investigations to determine whether there is a causal connection between the vaccine and these adverse reactions. In 1979-81, for example, the FDA sponsored a major study, carried out at UCLA,[26] which failed to find any correlation between DTP vaccine and

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> the large amount of reassuring data on teratogenicity that we have for Bendectin.

See also Robert L. Brent, *Editorial: The Bendectin Saga: Another American Tragedy*, 27 TERATOLOGY 283, 284 (1983):

> If the FDA and the epidemiological studies do not indicate that Bendectin is a teratogen, upon what are the lawsuits based? They are based on the ability to obtain expert witnesses who are willing to testify "with a reasonable degree of medical certainty" that Bendectin caused a particular malformation in a child and the incentive for an attorney of obtaining a large award for his client and himself.

[25] At its peak in 1922, there were 265,269 reported cases of pertussis and 9,269 deaths. Immunization Practices Advisory Committee, Centers for Disease Control, *Diphtheria, Tetanus, and Pertussis: Recommendations for Vaccine Use and Other Preventive Measures*, 40 MMWR 1, 3 (1991).

[26] *See* Institute of Medicine, ADVERSE EFFECTS OF PERTUSSIS AND RUBELLA VACCINES 323 (1991).

SIDS or long-term neurological disorders.[27] Subsequent studies have confirmed these findings, and there is now an all but unanimous consensus of the interested governmental and professional bodies that no causal relationship between the DTP vaccine and SIDS or long-term neurological disorders has been established.[28]

Despite the consensus, many product liability suits (based on the testimony of a small group of "experts" who regularly testify on behalf of personal injury claimants) alleging that DTP vaccine caused SIDS and other long-term neurological deficits were filed. Between 1960 and 1985 litigation costs drove seven of the eight manufacturers to withdraw their DTP vaccines from the market.[29] Were the remaining manufacturer to follow them, the nation would be faced with a health crisis of major proportions.[30]

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[27] *See* C.L. Cody, *et al.*, *Nature and Rates of Adverse Reactions Associated with DTP and DT Immunizations in Infants and Children*, 68 PEDIATRICS 650 (1981). The study did find a correlation between the vaccine and higher rates of "minor and short-term reactions." *Id.* at 658.

[28] *See* Institute of Medicine, *supra* note 26, at 118 & n.3; Immunization Practices Advisory Committee, *supra* note 25, at 10-11; Ad Hoc Committee for the Child Neurology Society Consensus Statement on Pertussis Immunization and the Central Nervous System, *Consensus Statement: Pertussis Immunization and the Central Nervous System*, 29 ANNALS OF NEUROLOGY 458, 458-59 (1991); Committee on Infectious Diseases, American Academy of Pediatrics, *The Relationship Between Pertussis Vaccine and Brain Damage: Reassessment*, 88 PEDIATRICS 397, 399 (1991); Therapeutics and Technology Assessment Subcommittee, American Academy of Neurology, *Assessment: DTP Vaccination*, 42 NEUROLOGY 471, 471 (1992).

[29] *See* Robert M. McKenna, *The Impact of Product Liability Law on the Development of a Vaccine Against the AIDS Virus*, 55 U. CHI. L. REV. 943, 955 (1988); *see also* Lasagna, *supra* note 23, at 342-43.

[30] *See* Alan R. Hinmon & Jeffrey P. Koplan, *Pertussis and Pertussis Vaccine: Reanalysis of Benefits, Risks, and Costs*, 251 J. AM.

The same threat has discouraged pharmaceutical manufacturers from conducting research into new products, particularly in areas where unexplainable tragedies can be expected to occur, such as obstetrics and fertility technology.[31]

In sum, Congress and the FDA have created an elaborate mechanism for regulating the sale of medicines. Through that process, principles and methodologies that are generally accepted in the scientific community are brought to bear on regulatory decisions about whether a medicine is safe enough to be marketed. If this Court were now to accept petitioners' invitation to open the door to scientific testimony not grounded in such principles and methodologies, the result would be to deprive the public of important medicines to combat sickness, pain and death.

MED. ASSOC. 3104, 3112 (1984) (if the vaccine were not administered, there would be approximately 350,000 cases of pertussis annually and approximately 457 deaths).

In 1986, Congress enacted the National Vaccine Compensation Act, 42 U.S.C. §§ 300aa-1 *et seq.*, establishing a fund to pay compensation for vaccine-related injury or death. The Act has not put an end to the possibility of DTP tort suits, however, because it does not apply to cases in which the vaccine was administered after September 30, 1992, *see* H.R. No. 4210, 102d Cong., 2d Sess., at 405 (1992) (Conference Report, Tax Fairness and Economic Growth Act of 1992), or in which plaintiffs fail to file within the statutorily required time period, 42 U.S.C. § 300aa-16 (1988). *See, e.g., Pease v. American Cyanamid*, 795 F. Supp. 755, 758 (D. Md. 1992) (DTP suit based on "scant" scientific data).

[31] *See, e.g.*, American Medical Association, *Impact of Product Liability on the Development of New Medical Technologies* (June 1988); Skolnick, *supra* note 3, at 1473; *see also* President's Council on Competitiveness, *Agenda for Civil Justice Reform in America* 3 (1991) (Conference Board study reported that fear of potential liability has resulted in 25 percent of U.S. manufacturers having discontinued some form of product research).

As we now show, the Federal Rules of Evidence bar such a result.

II. THE FEDERAL RULES OF EVIDENCE REQUIRE THE DISTRICT COURTS TO EXCLUDE SCIENTIFIC OPINION TESTIMONY NOT GROUNDED IN PRINCIPLES AND METHODOLOGIES GENERALLY ACCEPTED BY THE RELEVANT SCIENTIFIC COMMUNITY.

The issue in this case is not, as petitioners claim, whether the rule of *Frye v. United States*, 293 Fed. 1013 (D.C. Cir. 1923), "survived" the adoption of the Federal Rules of Evidence. The issue is whether Federal Rules require the exclusion of scientific testimony not grounded in principles and methodologies generally accepted by the relevant scientific community.[32] Our argument that they do rests on the text of the Rules.

Rule 102 states as follows:

> *Purpose and Construction.* These rules shall be construed to secure fairness in administration, elimination of unjustifiable expense and delay, and promotion of growth and development of the law of evidence to the end that the truth may be ascertained and proceedings justly determined.

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[32] It is surely relevant that such a requirement, as articulated in *Frye*, was widely accepted by the federal courts as part of the law of evidence at the time the Rules were adopted, *see United States v. Downing*, 753 F.2d 1224, 1234 (3rd Cir. 1985), and was nowhere rejected by the drafters of the Federal Rules. As this Court concluded on a similar question, *see United States v. Abel*, 469 U.S. 45, 50 (1984), it is unlikely that the drafters of the Rules intended, *sub silentio*, to scuttle a widely accepted evidentiary principle.

This text instructs the federal courts that the necessarily general provisions of the Rules are to serve as a foundation for the "growth and development of the law of evidence,"[33] and that the Rules are to be construed to achieve a purpose with which the courts have special familiarity: "that the truth may be ascertained" in court proceedings.[34] Rule 102 also makes it clear that the text of one Rule may bear on the meaning of another. As the Reporter said, the Rules "must not be read separately and in isolation but as a part of an entire system, with due regard to its plan and organization and to the contents of rules other than the particular one under consideration."[35] In sum, there is an explicit statutory instruction that the Rules that bear directly on this case, Rules 702, 703 and 403, are to be read together in light of their truth-seeking purpose.

Rule 702. Rule 702 states in part that if "scientific . . . *knowledge* will assist the trier of fact to . . . determine a fact in issue . . . an expert . . . may testify *thereto*." (Emphasis added.) As lower courts have

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[33] *See* Edward W. Cleary, Reporter for the Federal Rules of Evidence, *Preliminary Notes on Reading the Rules of Evidence*, 57 NEB. L. REV. 908, 912 (1978) (Rule 102 indicates that "all answers are not to be found in specific terms in the Rules"); Michael H. Graham, HANDBOOK OF FEDERAL EVIDENCE § 102.1 at 2 (3d ed. 1991) (Rule 102 negates the common law rule that statutes and rules in derogation of common law are to be strictly construed), *citing* James W. Moore, 2 MOORE'S FEDERAL PRACTICE § 1.13[1] at 1-60 (2d ed. 1989).

[34] Some courts have gone even further. *See United States v. Metzger*, 778 F.2d 1195, 1201 (6th Cir. 1985) ("[A]t times 'the technical requirements of [the] rules must bend in order to fulfill the objectives expressed in Rule 102,'" quoting Jack B. Weinstein & Margaret A. Berger, 1 WEINSTEIN'S EVIDENCE ¶ 102[01] at 102-7 (1985)), *cert. denied*, 477 U.S. 906 (1986).

[35] Cleary, *supra* note 33, at 917. *See Huddleston v. United States*, 485 U.S. 681, 687 (1988) (reading Article IV rules together).

recognized, the plain meaning of these words is that an expert may express an opinion based on what the relevant scientific community "knows." "[A]n expert is a conduit of facts and not merely a subjective speculator relying on stature alone."[36] The district court must make a preliminary inquiry under Rule 702 to "determine on the basis of evidence or by judicial notice that the subject matter of the expert's testimony is one as to which a reliable body of *scientific . . . knowledge* has been developed."[37] The textual limitation to "scientific . . . knowledge" applies both to general propositions of science asserted by a witness (*e.g.*, Bendectin causes birth defects) and to techniques and methodologies (*e.g.*, reanalysis of epidemiological evidence) that form the basis for the witness's testimony.

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[36] *Porter v. Whitehall Lab., Inc.*, 791 F. Supp. 1335, 1343 (S.D. Ind. 1992) (citing *American Nat'l Bank & Trust Co. v. K-Mart Corp.*, 717 F.2d 394, 399 (7th Cir. 1983)). *See also Viterbo v. Dow Chem. Co.*, 826 F.2d 420, 422 (5th Cir. 1987).

[37] Graham, *supra* note 33, § 702.4 (emphasis added); *see In re "Agent Orange" Prod. Liab. Litig.*, 611 F. Supp. 1223, 1241-42 (E.D.N.Y. 1985), *aff'd*, 818 F.2d 187 (2d Cir. 1987); *cf. Richardson v. Richardson-Merrell, Inc.*, 857 F.2d 823, 829 (D.C. Cir. 1988) ("[a court need not] accept uncritically any sort of opinion espoused by an expert merely because his credentials render him qualified to testify"), *cert. denied*, 483 U.S. 882 (1989).

Especially careful evaluation of scientific testimony is needed because the expert "assumes a posture of mystic infallibility in the eyes of a jury of laymen." *United States v. Addison*, 498 F.2d 741, 744 (D.C. Cir. 1974). Moreover, "close judicial analysis of such technical and specialized matter is necessary not only because of the likelihood of juror misunderstanding, but also because expert witnesses are not necessarily always unbiased scientists." *Turpin v. Merrell Dow Pharmaceuticals, Inc.*, 959 F.2d 1349, 1352 (6th Cir.), *cert. denied*, 113 S. Ct. 84 (1992). For these reasons, judges should "take hold of expert testimony in federal trials," especially when the expert testimony goes to a decisive substantive issue. *In re Air Crash Disaster at New Orleans, La.*, 795 F.2d 1230, 1233-34 (5th Cir. 1986).

By allowing testimony only as to "scientific . . . knowledge," the Rule instructs the courts to determine whether the principles and methodologies on which the testimony is based are accepted by "those most qualified to assess the general validity of a scientific method,"[38] *i.e.*, the relevant scientific community. As we showed at pages 13-14, *supra*, "scientific knowledge" is a meaningful and important concept even though the content of science is not fixed or immutable: it refers to propositions that the relevant scientific community would find reliable.

Scientific opinion testimony is limited to "scientific knowledge" because the explicit purpose is to "assist the trier of fact to understand the evidence or to determine a fact in issue." A scientific opinion that "lacks the foundation and reliability necessary to support expert testimony . . . does not serve the purposes for which it is offered, that is, objectively to assist the jury in arriving at its verdict." *Viterbo v. Dow Chemical Co.*, 826 F.2d 420, 424 (5th Cir. 1987). *See Sterling v. Velsicol*, 855 F.2d 1188, 1208 (6th Cir. 1988) (under Rule 702, in order to prevent jury deception or mistake, expert testimony must conform to generally accepted explanatory theory). It does not "assist the trier of fact" to determine the truth in a scientific controversy to allow that trier to rely on opinions that the scientific community would not rely on.

Rule 703. Rule 703 provides that if scientific testimony is based on facts or data not in evidence, the facts or data must be "of a type reasonably relied upon by experts in the particular field in forming . . . inferences upon the subject." In this case, as in most, the scientific witnesses relied substantially upon facts or data not in evidence: for example, plaintiffs' experts relied on their "reanalysis" of epidemiological studies. Plainly, most experts in the particular field would *not* rely on the "facts

[38] *Addison*, 498 F.2d at 743-44.

or data" relied on by these witnesses to conclude that Bendectin causes birth defects: the original studies led the scientific community to the opposite conclusion, and the reanalyses were not submitted for review by any other scientists, and the courts below were offered no basis to conclude that other scientists would rely upon them.

Petitioners argue (Br. 37) that "facts or data" refers only to bits of empirical information and not to any methodological aspect of a scientific study. But that argument is plainly wrong: as the circuits that have addressed the issue have held, the Rule makes no sense unless "facts or data" is construed to mean the entirety of any scientific study on which the proffered opinion is based.[39]

The bits of data in a scientific study are the result of rules of selection. It is simply meaningless to ask whether the bits of data, standing alone, would be "reasonably relied upon by experts" in the particular field: that

[39] "[C]ourts must critically evaluate the reasoning process by which the experts connect data to their conclusions in order for courts to consistently and rationally resolve the disputes before them." *Brock v. Merrell Dow Pharmaceuticals, Inc.*, 874 F.2d 307, 310, *modified*, 884 F.2d 166, *reh'g denied, en banc*, 884 F.2d 167 (5th Cir. 1989), *cert. denied*, 494 U.S. 1046 (1990).

In addition to *Brock* and the 9th Circuit's decision in this case, decisions applying Rule 703 to methodology include: *Lynch v. Merrell-Nat'l Lab.*, 830 F.2d 1190, 1195 (1st Cir. 1987) (reanalysis methodology rejected); *Christophersen v. Allied-Signal Corp.*, 939 F.2d 1106, 1115 (5th Cir. 1991) (courts must analyze validity of methodology by determining whether it connects facts to conclusions in scientifically valid way), *cert. denied*, 112 S. Ct. 1280 (1992); *United States v. Tranowski*, 659 F.2d 750, 756 (7th Cir. 1981) (accuracy of methodology for dating photographs by reference to position of sun not established); *Head v. Lithonia Corp.*, 881 F.2d 941, 943 (10th Cir. 1989) (expert must rely on methods that other experts in the field would rely on); *Richardson*, 857 F.2d at 831 (reanalysis methodology rejected).

depends on how they were selected and how they are analyzed.[40] For example, the fact that specified persons took a medicine, and that certain of them did and others did not experience a specified condition at some point thereafter, could not be relied on by any expert to prove anything. Those bits of data are meaningful only in conjunction with other facts that determine whether the specified persons are a proper sample of a relevant population, whether they have been compared with a properly selected control group, and similar matters. Without analyzing these other facts, one cannot tell whether the bits of data about individual patients would be "reasonably relied upon by experts in the particular field" in reaching the conclusion proffered.[41]

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[40] Many would argue that "data" and "methodology" cannot be separated at all:

> [I]n almost every act of our perceiving faculties, observation and inference are intimately blended. What we are said to observe is usually a compound result, of which one-tenth may be observation, and the remaining nine-tenths inference.

John Stuart Mill, 2 SYSTEM OF LOGIC 186 (5th ed. 1872) (quoted in Leonard K. Nash, THE NATURE OF THE NATURAL SCIENCES 11 (1953)).

[41] Petitioners argue (Br. 36) that Rule 703's only effect is to open the door to additional testimony, but the Advisory Committee's Note makes it clear that the Rule's language was intended to be restrictive: "If it be feared that enlargement of permissible data may tend to break down the rules of exclusion unduly, notice should be taken that the rule requires that the facts or data 'be of a type reasonably relied upon by experts in the particular field.'" FED. R. EVID. 703 Advisory Committee's note ¶ 3. Another expert has noted that the rule invites judicial scrutiny of the trustworthiness of the facts, data or opinions by its express reference to information that experts "reasonably" rely upon. *See* Graham, *supra* note 33, § 703.1 at 638, n.13.

Indeed, the Advisory Committee's comment on Rule 703 offers as an example of the operation of the Rule the use of public opinion poll evidence, where the issue is "the validity of the technique employed." The Committee cites with approval Judge Feinberg's opinion in *Zippo Manufacturing Co. v. Rogers Imports, Inc.*, 216 F. Supp. 670 (S.D.N.Y. 1963), admitting a public opinion survey on the ground that "the methodology of the survey" established its "trustworthiness." *Id.* at 684. *See also Toys "R" Us, Inc. v. Canarsie Kiddie Shop, Inc.*, 559 F. Supp. 1189, 1205 (E.D.N.Y. 1983) (public opinion survey data must be analyzed in accordance with "accepted statistical principles").

Rule 403. The principles that underlie Rule 403 reinforce the lower courts' interpretation of Rules 702 and 703. Rule 403 expressly authorizes a district judge to weigh the "probative value" of expert testimony and other evidence against "the danger of unfair prejudice, confusion of the issues, or misleading the jury."

As the district court recognized, JA 229, Rule 403 typically will not come into play directly, because scientific evidence whose probative value is substantially outweighed by the likelihood of confusing or misleading the jury will already have been screened out by Rule 702 and 703. And Rule 403 instructs the district court in permissive rather than mandatory terms. But Rule 403 clearly provides an additional textual basis for excluding scientific testimony based on theories or techniques not generally accepted by the relevant scientific community. In light of the truth-seeking purpose of the rules as a whole, "[a] false aura of scientific infallibility, coupled with low probative value, increases resistance to admitting evidence since it multiplies the hazards of misleading a jury." *In re "Agent Orange" Product Liability Litigation*, 611 F. Supp. at 1256.

Application of the General Acceptance Rule to This Case. The scientific opinion testimony principally at issue in this case was based on reanalyses of epidemiological studies conducted by other researchers. The district court rejected these opinions because the reanalyses had neither been subjected to critical review by other scientists nor otherwise shown to conform to accepted scientific techniques.

For example, the district court rejected the proffered testimony of Dr. Shanna Swan. Dr. Swan had "reanalyzed" a study conducted by the Centers for Disease Control (CDC), but she agreed that she had "never written up the study or paper so that someone can actually look at and consider how you actually arrived at your data." JA 141. Her "reanalysis" lacked generally acceptable indicia of scientific reliability: it was financed by plaintiff's attorneys solely for the purpose of litigation, JA 138, and it was not made available for examination and verification by members of the scientific community.[42] The court properly ruled that under the circumstances her "unsupported" allegation that statistics link Bendectin to birth defects was "insufficient." JA 236.[43]

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[42] Dr. Swan's conclusions appeared in a one-paragraph abstract describing an upcoming conference presentation, but that 200-word summary did not provide details sufficient for scientific evaluation of her reanalysis. JA 141; Shanna Swan, *Methodological Issues in the Study of Prenatal Drug Exposures and Congenital Malformations: Bendectin Reanalyzed* (abstract) 120 AM. J. OF EPIDEMIOL. 486, 486-87 (1984). *See DeLuca v. Merrell Dow Pharmaceuticals*, 791 F. Supp 1042, 1050 (D.N.J. 1992) (Dr. Swan provided no explanation for never submitting her reanalysis for publication).

[43] The same evidence had been proffered in *Lynch v. Merrell-Nat'l Lab.*, 830 F.2d at 1195. That court said that Dr. Swan's reanalysis consisted of selecting a *subset* of the participants in a CDC study and comparing the children of Bendectin users to children born with Down's syndrome. The court rejected this reanalysis because there was no proffered scientific basis to exclude the possibility that a lower

Two other witnesses offered by plaintiffs had also performed "reanalyses" lacking indicia of reliability. Dr. Jay Glasser and Dr. Alan Done would testify to their unpublished calculations that revisited previous studies by selecting from within already small population samples. Like Dr. Swan, knowing the results plaintiffs wanted, they conducted their unique reanalyses, sifting through 63 and 31 participants respectively to select even smaller samples.[44] In *DeLuca v. Merrell Dow Pharmaceuticals*, 791 F. Supp. 1042 (D.N.J. 1992), on remand from the Third Circuit, *DeLuca v. Merrell Dow Pharmaceuticals*, 911 F.2d 941 (3d Cir. 1990), the District Court found Dr. Done's reanalysis testimony so riddled with errors as to be inadmissible. His precise method of calculations "was a mystery and was not in conformance with any known methodology," 791 F. Supp. at 1048; qualified epidemiologists could not replicate his recalculations, *id.*; he had mistakenly transposed entries of data, *id.* at 1049; he had included studies of women who had ingested ingredients not found in Bendectin, *id.*; and he had ignored two contrary studies of women who did ingest Bendectin, *id.* at 1051.

The issue, of course, is not whether "reanalysis" of a statistical study is an accepted technique. It is whether particular reanalyses, performed for the purpose of litigation and involving adjustments to the database so as to change the numerators and denominators of the pertinent fractions, but not written up or submitted for review by other scientists, constitute "scientific . . . knowledge." In this case, the reanalyses contradicted the findings of more

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incidence of limb reduction birth defects was attributable to the same genetic defect that causes Down's syndrome. *Id.*

[44] *Brock*, 874 F.2d at 312; *Lynch*, 830 F.2d at 1195. The Ninth Circuit opinion in this case said the courts in *Brock* and *Lynch* considered "largely the same evidence presented to the district court below." JA 239.

than thirty other studies, JA 238, were prepared solely for purposes of litigation, condoned a wider margin of error than the usual 95 percent confidence interval, JA 151, involved selection from samples so small that slight adjustments could easily affect the result, had not been reviewed by others in the field (indeed were not even accessible to others), and were not otherwise shown to have been carried out in a manner that other scientists would accept. The district court's determination that testimony based on these reanalyses was not testimony as to "scientific . . . knowledge" was entirely correct.

CONCLUSION

The decision of the United States Court of Appeals for the Ninth Circuit should be affirmed.

Respectfully submitted,

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January 19, 1993